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Results of the Puritan-American Museum of Natural History Expedition to Western Mexico
19. The Recent Mollusks: Gastropoda, Strombacea, Tonnacea, and Cymatiacea

By William K. Emerson[1] and William E. Old, Jr.[2]

INTRODUCTION

The present paper continues a study of the Recent marine mollusks collected in west Mexican waters during the course of the expedition. The first report considered the family Conidae (Emerson and Old, 1962); the second report covered the superfamily Cypraeacea (Emerson and Old, 1963b). The present report treats the superfamilies Strombacea, Tonnacea, and Cymatiacea. Other reports are in progress.

Specimens were taken by shore and intertidal collecting, by skin diving, and by dredging from a small skiff and from the schooner "Puritan." Dredging operations were restricted to depths no greater than 50 fathoms. The itinerary and descriptions of the collecting stations were recorded in the General Account of the expedition (Emerson, 1958).

All the known species of the Strombacea and Tonnacea from the eastern Pacific are represented in the present collection. Of the 14 species of

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Cymatiacea, excluding the family Bursidae, listed by Keen (1960), only six species are represented in the present collection. However, one additional species, *Cymatium* (*Septa*) *pileare* (Linné), 1758, is herein recognized in the Panamic faunal province.

This paper includes records that extend the known geographic and bathymetric ranges of some of the species representing the three superfamilies covered by this report. An attempt also has been made to determine for the west Mexican region the modern and fossil distributions of these species. Juvenile specimens are illustrated for many of the species.

We are indebted to a number of people for aid in the completion of this paper. Dr. R. Tucker Abbott of the Academy of Natural Sciences of Philadelphia, Mr. E. P. Chace of the San Diego Natural History Museum, Dr. William J. Clench of Harvard University, Dr. A. Myra Keen of Stanford University, and Drs. Harald A. Rehder and Joseph P. E. Morrison of the United States National Museum of the Smithsonian Institution generously permitted access to the collections of their respective institutions or provided specimens on loan. Mrs. Faye Howard and Mr. Gale G. Sphon of the Santa Barbara Museum of Natural History, Dr. Donald R. Shasky of Glendale, California, Mr. Stanley Levine of New York City, Mr. Harris Dawson, of Washington, D. C., and Mrs. Helen DuShane of Altadena, California, kindly gave locality data or lent specimens. We are particularly indebted to Dr. G. Bruce Campbell of Lynwood, California, for the loan of photographs and for other assistance. Finally, Dr. H. E. Coomans of the American Museum of Natural History assisted us in various ways.

The following abbreviations have been used to designate institutions listed in the present paper:

A.M.N.H., the American Museum of Natural History
A.N.S.P., Academy of Natural Sciences of Philadelphia
B.M.N.H., British Museum (Natural History)
S.D.N.H.M., San Diego Natural History Museum
U.S.N.M., United States National Museum, Smithsonian Institution

SYSTEMATIC ACCOUNT

SUPERFAMILY STROMBACEA

FAMILY STROMBIDAE

GENUS *STROMBUS* LINNÉ, 1758

TYPE SPECIES: *Strombus pugilis* Linné, 1758, Recent, western Atlantic, by subsequent designation of Montfort, 1810.

Monographs of the extant species of this genus have recently appeared

for the western Atlantic (Clench and Abbott, 1941) and the Indo-Pacific (Abbott, 1960) regions. The latter paper gives synonymies of the subgeneric taxa and includes the known extinct species of the Indo-Pacific region.

SUBGENUS *STROMBUS, SENSU STRICTO*

Strombus (*Strombus*) *gracilior* Sowerby, 1825

Figure 1

Strombus gracilior G. B. Sowerby, I, 1825, app. p. xx. Wood, 1828, p. 13, pl. 4, fig. 1. Kiener, 1843, pp. 31, 32, pl. 21, fig. 1. Reeve, 1851 (1850–1851), *Strombus* pl. 16, fig. 38. Keen, 1958, p. 336, fig. 308.

Strombus (*Strombus*) *gracilior* Sowerby, Tryon, 1885a, p. 109, pl. 2, fig. 17.

Range: Punta Peñasco, Sonora, Mexico (Keen, 1947), in the Gulf of California, and south to Peru (Keen, 1958).

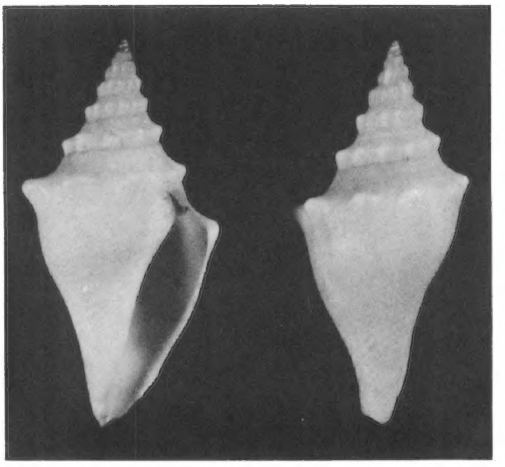


Fig. 1. Two juvenile specimens of *Strombus (Strombus) gracilior* Sowerby, off south end of San Marcos Island, Baja California, Mexico, "Puritan" dredge, 10–11.5 fathoms (Station 151; A.M.N.H. No. 76802a). *Left:* Apertural view. *Right:* Dorsal view. × 2.

Collecting Stations: *Baja California, Gulf coast:* Off Espíritu Santo Island, "Puritan" dredge, 5–9 fathoms, one living, juvenile specimen (Station 95); off Espíritu Santo Island, "Puritan" dredge, 10–12 fathoms, one fresh, juvenile specimen (Station 96); off San José Island, "Puritan" dredge, 13.5–17.5 fathoms, one living, juvenile specimen (Station 115); skin diving, 0.5–1 fathoms, one dead specimen (Station 135); San Marcos Island, shore collecting, 30 beach specimens collected, numerous others seen (Station 149); off San Marcos Island, "Puritan" dredge, 5–7 fathoms, one living, juvenile specimen (Station 150); off San Marcos Island, "Puritan" dredge, 10–11.5 fathoms, two living, juvenile specimens (Station 151); Gonzaga Bay, shore collecting, four beach specimens (Station 176).

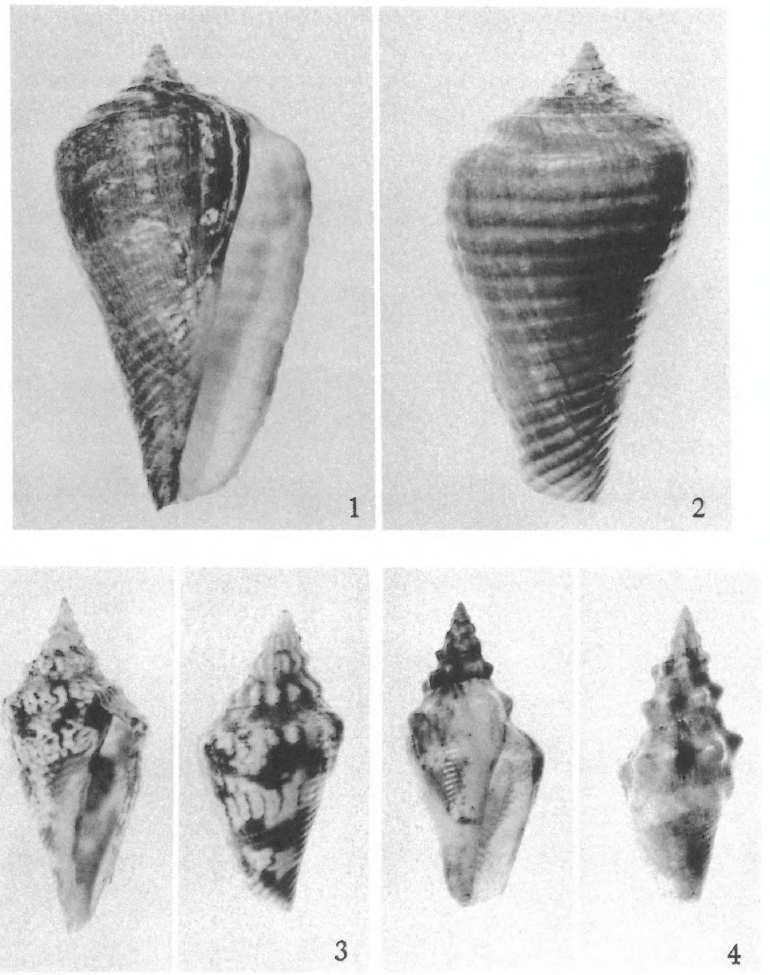


FIG. 2. Subadult specimen of *Strombus (Tricornis) galeatus* Swainson, with an immature lip, Venado Island, Panama (*ex* W. B. Mackley; A.M.N.H. No. 86737). *Left:* Apertural view. *Right:* Dorsal view. × ½.

FIG. 3. Juvenile specimen of *Strombus (Tricornis) galeatus* Swainson, Gorgona Island, Colombia (*ex* William Beebe; A.M.N.H. No. 88619). *Left:* Apertural view. *Right:* Dorsal view. × 1.25.

FIG. 4. Two juvenile specimens of *Strombus (Lentigo) granulatus* Swainson. *Left:* María Madre Island, Tres Marías Islands, Mexico, "Puritan" dredge, 6–10 fathoms (Station 73; A.M.N.H. No. 75582); apertural view. × 1. *Right:* Off Salinas Bay, east side of Carmen Island, Baja California, Mexico, "Puritan" dredge, 5–8 fathoms (Station 134; A.M.N.H. No. 76351); dorsal view. × 1.25.

REMARKS: Strangely enough, this species does not appear to have become established in the Tres Marías Islands. It was not encountered by the present expedition and was not cited from these islands by Stearns (1894) or by Strong and Hanna (1930), nor is it reported to occur in the fossil record of these islands by Hertlein (1934) or by Hertlein and Emerson (1959).

This species was reported from the Pliocene of Coyote Mountain, Imperial County, California (Hanna, 1926), and from the Pleistocene of Baja California at the following localities: San Ignacio Lagoon (Jordan, 1924; Hertlein, 1934), Magdalena Bay (Dall, 1918; J. P. Smith, 1919; Jordan, 1924, 1936) on the west coast, and near Punta Chivato, Tiburón Island (Durham, 1950), Santa Inez Bay, Punta Coyote, and Punta Pulpito (Hertlein, 1957) in the Gulf of California.

SUBGENUS *TRICORNIS* JOUSSEAUME, 1886

TYPE SPECIES: *Tricornis tricornis* (Lamarck), 1816 [= *Strombus tricornis* Solander, *in* Humphrey, 1786], Recent, Indo-Pacific, by monotypy.

Strombus (*Tricornis*) *galeatus* Swainson, 1823

Figures 2, 3

Strombus galeatus SWAINSON, 1823b, p. 401. KIENER, 1843, pp. 5, 6, pl. 2. REEVE, 1850 (1850–1851), *Strombus* pl. 3. KEEN, 1958, p. 336, fig. 307.
[?] *Strombus crenatus* G. B. SOWERBY, I, 1825, app. p. xix.
Strombus galea WOOD, 1828, p. 14, pl. 4, figs. 13, 14.
Strombus (*Strombus*) *galeatus* Swainson, TRYON, 1885a, p. 108, pl. 1, fig. 6.

RANGE: Punta Peñasco, Sonora, Mexico (Lowe, 1935), in the Gulf of California, and south to Manta, Ecuador (United States National Museum collection).

COLLECTING STATIONS: *Baja California, Gulf coast:* San Gabriel Bay, Espíritu Santo Island, skin diving, 1–1.5 fathoms, one living specimen collected, several others seen (Station 98). *Tres Marías Islands, Nayarit:* South of Puerto Balleto, María Madre Island, 0.5–1 fathom, skin diving, two dead specimens (Station 25); Puerto Balleto, María Madre Island, shore collecting, one living specimen (Station 34); María Magdalena Island, shore collecting, one fresh specimen (Station 48).

REMARKS: Although this species has not been reported to be living on the Pacific coast of Baja California, it is known to occur at Cape San Lucas (the American Museum collection) and has been cited by Jordan (1936) from the Pleistocene of Magdalena Bay, on the west coast of the peninsula.

It has been recorded from the Pliocene of Coyote Mountain, Impe-

rial County, California (Hanna, 1926), Santa Antonita Point, Coronados Island, Carmen Island, and Ceralvo Island (Hanna and Hertlein, 1927) in the Gulf of California.

It also was listed from the Pleistocene of Baja California at the following localities: Punta Pulpito (Hertlein, 1957), Carmen Island (Durham, 1950; Hertlein, 1957), Coronados Island, Santa Inez Bay, Punta San

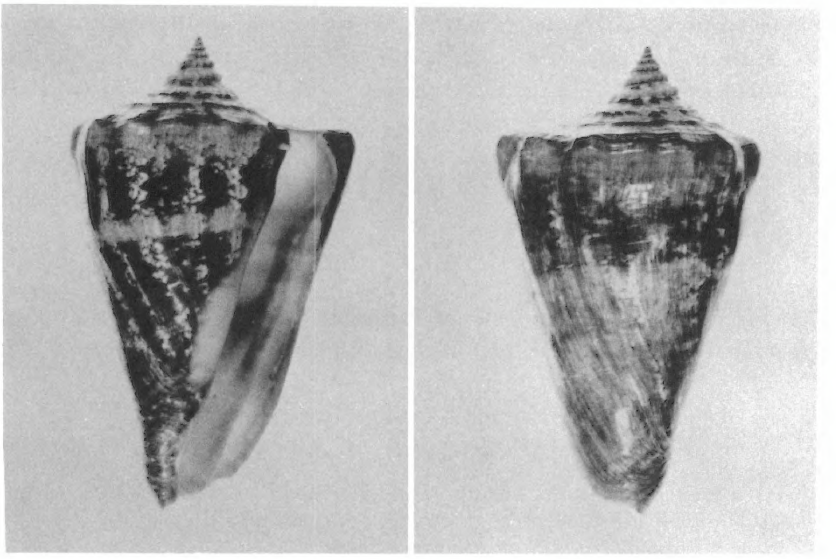


FIG. 5. Subadult specimen of *Strombus (Tricornis) peruvianus* Swainson, with an immature lip, Venado Island, Panama (*ex* W. B. Mackley; A.M.N.H. No. 86737). *Left:* Apertural view. *Right:* Dorsal view. × ½.

Telmo (Durham, 1950), and Ceralvo Island (Emerson, 1960), and was cited from the Pleistocene of the Tres Marías Islands (Hertlein and Emerson, 1959).

Strombus (Tricornis) peruvianus Swainson, 1823

Figure 5

Strombus peruvianus SWAINSON, 1823a, p. 377; 1830 [1829–1833], pl. 39. KIENER, 1843, pp. 11, 12, pl. 8. REEVE, 1850 (1850–1851), *Strombus* pl. 5, fig. 6. KEEN, 1958, pp. 336, 337, fig. 310.

Strombus (Monodactylus) peruvianus Swainson, TRYON, 1885a, p. 112, pl. 3, fig. 29.

RANGE: Tres Marías Islands, Nayarit, Mexico, and south to Peru (Keen, 1958).

COLLECTING STATIONS: *Tres Marías Islands, Nayarit:* María Magdalena

Island, shore collecting, five living and seven fresh, beach specimens collected, many others seen (Station 48).

REMARKS: A severe storm had stranded numerous living and recently killed specimens of this species on the beach at high-tide line.

The females of this species are reported to attain a larger size than the males (Keen, 1958). The soft parts were retained for two specimens, one male and one female, both shells having five post-nuclear whorls. The winged outer lip of the shell of the female measures 149 mm. in length, whereas that of the male measures 142 mm. The measurements of the smallest specimen in the present collection with the same number of post-nuclear whorls is 109 mm.; however, the sex of this specimen is unknown.

SUBGENUS *LENTIGO* JOUSSEAUME, 1886

TYPE SPECIES: *Lentigo lentiginosus* (Linné), 1758 [= *Strombus lentiginosus* Linné, 1758], Recent, Indo-Pacific, by monotypy.

Strombus (*Lentigo*) *granulatus* Swainson, 1822

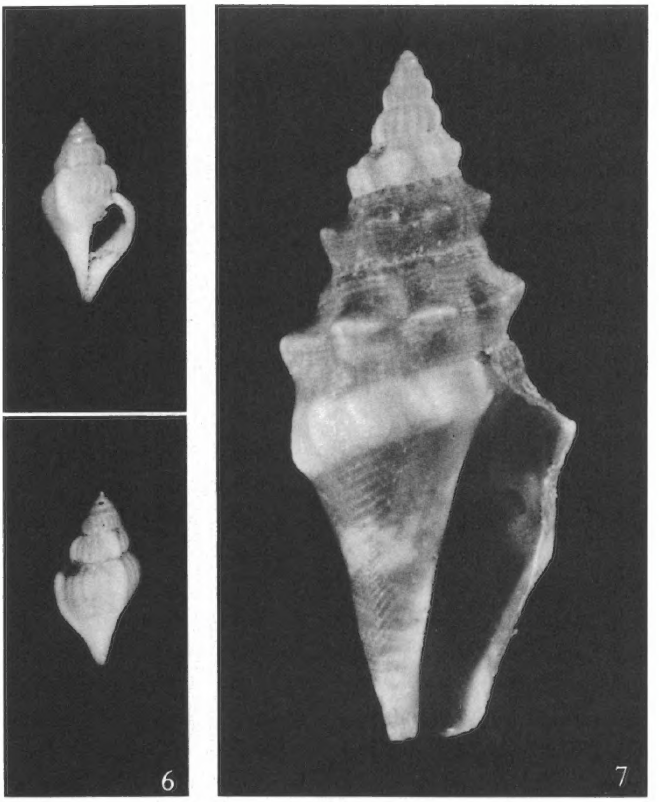
Figures 4, 6–8

Strombus granulatus SWAINSON, 1822, app. p. 8. MAWE, 1823, pp. 125, 127, pl. 25, fig. 3. WOOD, 1828, p. 14, pl. 4, fig. 21. SWAINSON, 1841, p. 36. KIENER, 1843, pp. 28, 29, pl. 22, fig. 1. REEVE, 1850 (1850–1851), *Strombus* pl. 14, fig. 32. KEEN, 1958, p. 336, fig. 309.

RANGE: Magdalena Bay, west coast of Baja California (United States National Museum collection), to San Luis Island, Baja California, Mexico ("Puritan" expedition), in the Gulf of California, and south to Manta, Ecuador (United States National Museum collection), and the Galapagos Islands (Hertlein and Strong, 1955a).

COLLECTING STATIONS: *Baja California, Gulf coast:* Los Frailes Bay, "Puritan" dredge, 20–40 fathoms, one dead, juvenile specimen (Station 89); Espíritu Santo Island, shore collecting, one beach specimen (Station 92); off Espíritu Santo Island, "Puritan" dredge, 10–12 fathoms, two living specimens and one dead specimen (Station 96); off Isla Partida, skiff dredge, 13 fathoms, one living, juvenile specimen (Station 104); off San José Island, "Puritan" dredge, 13.5–17.5 fathoms, eight juvenile and three adult, living specimens and one dead specimen (Station 115); off Salinas Bay, Carmen Island, "Puritan" dredge, 5–8 fathoms, one living, juvenile specimen (Station 134); Puerto Escondido, shore collecting, one beach specimen (Station 136); off Puerto Escondido, "Puritan" dredge, 18–20 fathoms, one living, juvenile specimen (Station 138); off Coronados Island, "Puritan" dredge, three living specimens (Station 144); San Marcos Island, shore collecting, five beach specimens (Station 149); off

San Marcos Island, "Puritan" dredge, 10–11.5 fathoms, three living, juvenile specimens (Station 151); Mejia Island, shore collecting, one beach specimen (Station 171); Gonzaga Bay, shore collecting, one juvenile beach specimen (Station 176); San Luis Island, beach collecting, two



FIGS. 6, 7. Juvenile specimens of *Strombus (Lentigo) granulatus* Swainson. 6. Off María Madre Island, Tres Marías Islands, Mexico, "Puritan" dredge, 15–16 fathoms (Station 72; A.M.N.H. No. 75509). *Upper:* Apertural view. *Lower:* Dorsal view. × 4. 7. Off Salinas Bay, east side of Carmen Island, Baja California, Mexico, "Puritan" dredge, 5–8 fathoms (Station 134; A.M.N.H. No. 76351); apertural view. × 3.

beach specimens (Station 181). *Sonora:* San Pedro Bay, shore collecting, one beach specimen (Station 156); Tiburón Island "Puritan" dredge, 10 fathoms, four living specimens (Station 159). *Tres Marías Islands, Nayarit:* Off San Juanito Island, skiff dredge, 9–11 fathoms, five juvenile, living specimens (Station 38); Puerto Balleto, María Madre Island, shore collecting, four beach specimens (Station 27); north of Puerto Balleto, María

Madre Island, skiff dredge, 10 fathoms, one juvenile specimen (Station 28); off Puerto Balleto, María Madre Island, skiff dredge, 8 fathoms, one dead, juvenile specimen (Station 30); María Madre Island, shore collecting, one living specimen and one dead specimen (Station 33); Puerto Balleto, María Madre Island, shore collecting, three living specimens and four beach specimens (Station 34); off María Madre Island, "Puritan" dredge, 14–15 fathoms, one dead, juvenile specimen (Station 72); off María Madre Island, "Puritan" dredge, 6–10 fathoms, five juvenile specimens (Station 73); off María Madre Island, "Puritan" dredge, 15–16 fathoms, three living specimens and one dead specimen (Station 74); off María Magdalena Island, skiff dredge, 9–11 fathoms, two living, juvenile specimens (Station 49); off María Magdalena Island, skiff dredge, 5–7 fathoms, one dead specimen (Station 50); off María Magdalena Island, skiff dredge, 3–4 fathoms, one living, adult specimen and one dead juvenile specimen (Station 51); María Magdalena Island, shore collecting, numerous specimens, including many fresh specimens with animals (Station 48); María Magdalena Island, shore collecting, three beach specimens (Station 52); off María Magdalena Island, skiff dredge, 4–6 fathoms, two dead specimens (Station 57).

REMARKS: This species exhibits considerable variation in the over-all size attained, the height of the spire and nodules, and the development of the parietal callus. Durham (1950) named a subspecies, *Strombus granulatus acutus*,[1] from Pliocene and Pleistocene deposits in the Gulf of California area. This form was described as being shorter, with longer and sharper nodes and with weaker spiral ribbing than the typical form of this species.

Sexual dimorphism in shell characters apparently is expressed in this species, as well as other species of this genus (cf. Abbott, 1949), by minor differences in size. In the absence of complete apices, measurements were made of the length of the outer lip of the shells of 11 specimens, five males and six females, in the present collection. Although these samples obviously are not large enough for a basis for any definite conclusions, the females were found to average slightly larger than the males, but the medians are essentially the same for the two samples. The males ranged from 49.5 to 54.2 mm., with an average of 51.74 mm. and a median of 51.6 mm.; the females ranged from 47.9 to 56.6 mm., with an average of 52.21 mm. and a median of 51.7 mm. These do not represent the largest or smallest specimens taken on the expedition.

The figured specimens represent a range of development of the parietal

[1] Not *Strombus acutus* Perry (1811) [= *Strombus* (*Euprotomus*) *vomer* Röding (1798)]; Durham (1962) later renamed his taxon *Strombus granulatus cortezianus*.

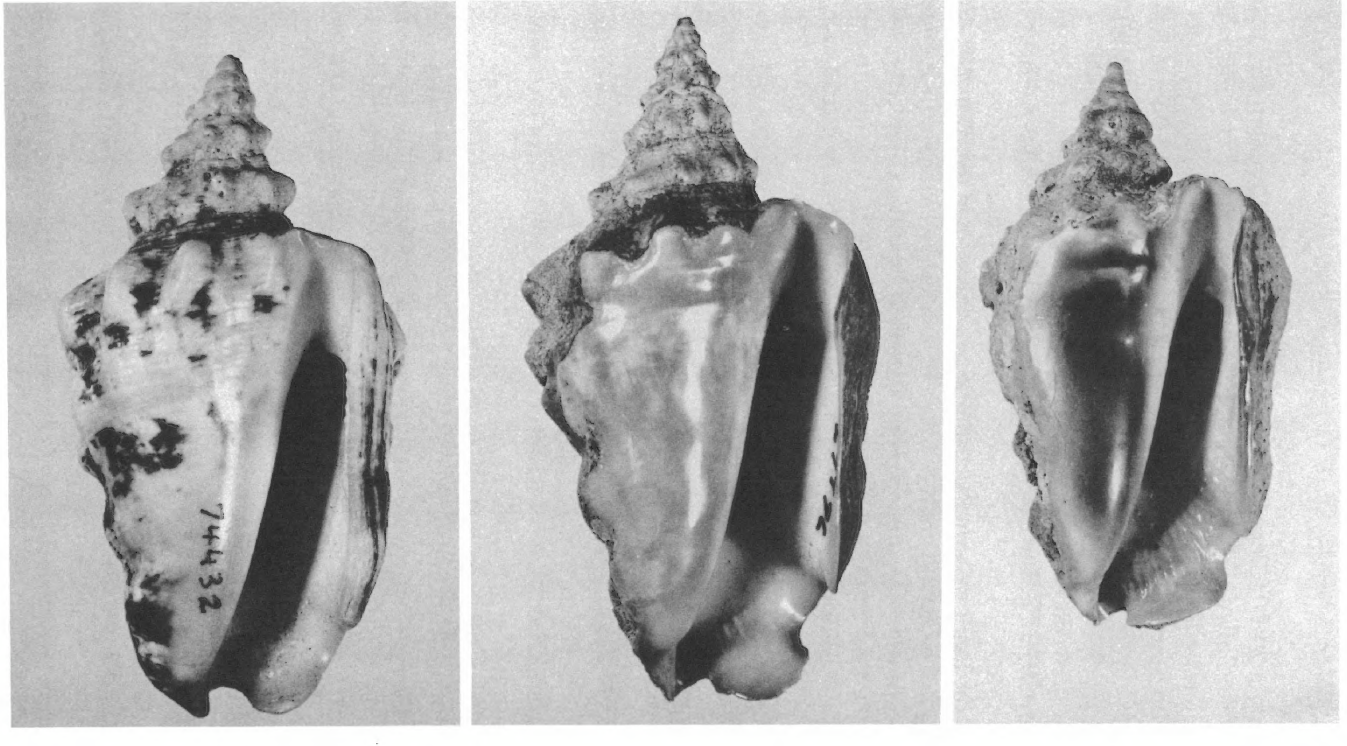


FIG. 8. Apertural view of adult specimens of *Strombus (Lentigo) granulatus* Swainson, showing variation in development of parietal glaze. *Left:* María Magdalena Island, Tres Marías Islands, Mexico, shore (Station 48; A.M.N.H. No. 74432). *Center:* San José Island, Baja California, Mexico, "Puritan" dredge, 13.5–17.5 fathoms (Station 115; A.M.N.H. No. 76167). *Right:* Off María Madre Island, Tres Marías Islands, Mexico, "Puritan" dredge, 15–16 fathoms (Station 74; A.M.N.H. No. 75645). × 1.

callus in this species. The first specimen (fig. 8, left) has the typical, weakly developed callus; the second (fig. 8, center), a thin, light brown callus; and the third (fig. 8, right), a heavy, dark brown callus. Also note the variation in the height of the spires and the size of the nodules.

The following fossil occurrences were noted for this species in Baja California: Pliocene of Carmen Island in the Gulf of California (Hanna and Hertlein, 1927) [= *Strombus granulatus acutus* Durham, *fide* Durham, 1950],[1] Pleistocene of Turtle Bay (Chace, 1956) and Magdalena Bay (Stearns, 1894; Dall, 1918; J. P. Smith, 1919; Jordan, 1924, 1936) on the west coast, and Punta Pulpito (Hertlein, 1957), Carmen Island (Durham, 1950; Hertlein, 1957), Palmas Bay (Hertlein, 1957), and Ceralvo Island (Emerson, 1960) in the Gulf of California. It is also reported from the Pleistocene of the Tres Marías Islands (Hertlein, 1934).

Durham (1950) recorded *"Strombus granulatus acutus"*[1] from the Pliocene of San Marcos Island and Carmen Island and the Pleistocene of Coronados Island, Santa Inez Bay, Punta San Telmo, and Bahía Concepción. All these localities are in the Gulf of California.

Strombus obliteratus Hanna (1926), from the Pliocene of Coyote Mountain, Imperial County, California, was stated to be closely related to *Strombus granulatus,* but to be shorter and stouter, with different and more prominent spinose sculpture (Grant and Gale, 1931).

SUPERFAMILY TONNACEA

FAMILY TONNIDAE

GENUS *MALEA* VALENCIENNES, 1832

TYPE SPECIES: *Malea latilabris* Valenciennes, 1832 [= *Cassis ringens* Swainson, 1822], Recent, eastern Pacific, by subsequent designation of Herrmannsen, July 17, 1847, and Gray, November, 1847.

Malea (Malea) ringens (Swainson), 1822

Figure 9

Cassis ringens SWAINSON, 1822, app. p. 4; 1841, p. 35.

Dolium dentatum BARNES, 1824, p. 135, pl. 9, fig. 3. BAYER, 1937, p. 30.

Dolium personatum MENKE, 1828, p. 35; 1830, p. 62.

Buccinum ringens, WOOD, 1828, p. 11, pl. 4, fig. 1. Not Reeve, 1846.

Malea latilabris VALENCIENNES, 1832, p. 325; refers to *Buccinum* pl. 4, fig. 1, of Wood, 1828.

Malea crassilabris VALENCIENNES, 1832, p. 327.

Dolium latilabre KIENER, 1835b, pp. 14, 15, pl. 4, fig. 7; refers to *Buccinum* pl. 4, fig. 1, of Wood, 1828.

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[1] See footnote on page 9.

Dolium plicosum DESHAYES AND MILNE-EDWARDS, 1845, p. 138.
Dolium ringens Swainson, TRYON, 1885b, p. 265, pl. 5, fig. 27.
Malea ringens Swainson, TURNER, 1948, pp. 176, 177, pl. 80. KEEN, 1958, p. 338, fig. 311.
Tonna (Malea) ringens Swainson, KILIAS, 1962, pp. 17–19, fig. 14.

RANGE: San Ignacio Lagoon, west coast of Baja California (Jordan, 1924), to San Felipe, Baja California, Mexico (Ross Hardy collection), in the Gulf of California, and south to Paita, Peru, and the Galapagos Islands (Dall, 1909).

COLLECTING STATIONS: *Tres Marías Islands, Nayarit:* San Juanito Island, shore collecting, two discolored beach specimens (Station 36); María Magdalena Island, shore collecting, one beach specimen (Station 48); Cleofas Island, shore collecting, one juvenile beach specimen (Station 65).

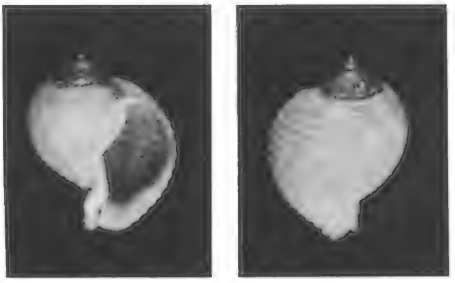


FIG. 9. Juvenile specimen of *Malea (Malea) ringens* (Swainson), La Union, Gulf of Fonseca, El Salvador, 11 fathoms (*ex* William Beebe; A.M.N.H. No. 88824). *Left:* Apertural view. *Right:* Dorsal view. × 2.

REMARKS: This distinctive species has been reported from the Pliocene of Coyote Mountain, Imperial County, California (Hanna, 1926), and Arroyo de Gua, near Loreto, east side of Baja California (Durham, 1950). It also was cited from the Pleistocene of Magdalena Bay on the west coast of Baja California (Jordan, 1936), of Carmen Island off the Gulf coast of Baja California (Durham, 1950), and of Oaxaca, Mexico (Palmer and Hertlein, 1936).

FAMILY CASSIDIDAE

GENUS *CYPRAECASSIS* STUTCHBURY, 1837

TYPE SPECIES: *Buccinum rufa* Linné, 1758, Recent, Indo-Pacific, by original designation.

Cypraecassis tenuis (Wood), 1828

Figure 10

Cassis tenuis WOOD, 1828, p. 33, pl. 4, fig. 4.
Cassis massenae KIENER, 1835a, p. 17, pl. 8, fig. 14; refers to pl. 4, fig. 4, of Wood, 1828.

FIG. 10. Apertural view of adult specimen of *Cypraecassis tenuis* (Wood), María Madre Island, Tres Marías Islands, Mexico (Station 27; A.M.N.H. No. 74147). × ⅔.

FIG. 11. Apertural view of adult specimen of *Cypraecassis (Levenia) coarctata* (Sowerby), María Magdalena Island, Tres Marías Islands, Mexico (Station 48; A.M.N.H. No. 74453). × 1.

Cassis (Cypraecassis) tenuis Wood, TRYON, 1885c, pp. 272, 273, pl. 2, fig. 53. KEEN, 1958, p. 340, fig. 312.

RANGE: Salinas Bay, Carmen Island, Baja California, Mexico (United States National Museum collection), in the Gulf of California, and south to Ecuador (Keen, 1958) and the Galapagos Islands (Hertlein and Strong, 1955a).

COLLECTING STATIONS: *Baja California, Gulf coast:* Espíritu Santo Island, shore collecting, one beach specimen (Station 92). *Tres Marías Islands, Nayarit:* San Juanito Island, shore collecting, one beach specimen (Station 36); María Madre Island, shore collecting, two beach specimens, including one juvenile (Station 27); María Magdalena Island, shore collecting, three beach specimens (Station 48).

REMARKS: This species was not reported from the Tres Marías Islands by Stearns (1894) or by Strong and Hanna (1930).

SUBGENUS *LEVENIA* GRAY, 1847

TYPE SPECIES: *Cassis coarctatum* Gray [= *Cassis coarctata* Sowerby, 1825], Recent, eastern Pacific, by original designation.

Cypraecassis (Levenia) coarctata (Sowerby), 1825

Figure 11

Cassis coarctata G. B. Sowerby, I, 1825, app. p. xxi. Wood, 1828, p. 33, pl. 4, fig. 5.
Cassis (Levenia) coarctata Sowerby, Grant and Gale, 1931, p. 740. Keen, 1958, p. 340, fig. 313.

Range: Santa Margarita Island, west coast of Baja California (Stearns, 1894), to Puertecitos, Baja California, Mexico (DuShane, 1962), in the Gulf of California, and south to Mancora, Peru (Olsson, 1924).

Collecting Stations: *Baja California, Gulf coast:* San Esteban Island, shore collecting, one beach specimen (Station 164); near San Carlos Bay, shore collecting, one beach specimen (Station 122); San Marcos Island, shore collecting, one beach specimen (Station 149); South San Lorenzo Island, shore collecting, three beach specimens (Station 166). *Sonora:* San Carlos Bay (ocean side), skin diving, three dead specimens (Station 155). *Tres Marías Islands, Nayarit:* San Juanito Island, shore collecting, two beach specimens (Station 36); Puerto Balleto, María Madre Island, shore collecting, five beach specimens (Station 27); María Madre Island, "Puritan" dredge, 6–10 fathoms, one dead specimen (Station 73); María Magdalena Island, shore collecting, three beach specimens (Station 48); Cleofas Island, shore collecting, four beach specimens (Station 65).

Remarks: The size attained by this species seems to vary considerably. In present collections, specimens with five post-nuclear whorls range in height from 42 mm. (Station 155) to 74 mm. (Station 65); the smaller specimens may be males.

This species has been reported in the Gulf of California from the Pliocene of Monserrate Island, Baja California (Hanna and Hertlein, 1927), from the Pleistocene of Punta Pulpito (Hertlein, 1957), Coronados Island (Durham, 1950), and Ceralvo Island (Emerson, 1960), and from the Pleistocene of Escondido Bay, Oaxaca, Mexico (Grant and Gale, 1931).

GENUS *CASMARIA* ADAMS AND ADAMS, 1853

Type Species: *Buccinum vibex* Linné, 1758, Recent, Indo-Pacific, by subsequent designation of Harris, 1897.

Casmaria vibexmexicana (Stearns), 1894

Figures 12, 13

Cassis (Casmaria) vibex Linné, Stearns, 1893, p. 348. Not Linné, 1758.
Cassis (Casmaria) vibex-mexicana Stearns, 1894, p. 188.
Cassis vibex mexicana [*sic*] Stearns, Hertlein, 1937, vol. 78, p. 306.
Cassis (Phalium) vibex (Linnaeus), Keen, 1958, p. 340. Not Linné, 1758.
Cassis (Phalium) vibex-mexicana Stearns, Keen, 1960, p. 340, fig. 314.
Cassis (Casmaria) vibexmexicana Stearns, Emerson and Old, 1963a, p. 145, pl. 10.

RANGE: San José Island, Baja California (Lowe, 1933), to La Paz, Baja California (Keen, 1960), in the Gulf of California, and south to the Tres Marías Islands, Mexico (Stearns, 1893).

COLLECTING STATION: *Tres Marías Islands, Nayarit:* San Juanito Island, shore collecting, one hermit-crab specimen (Station 36).

REMARKS: This species was based on two beach specimens, one from the Tres Marías Islands, Nayarit, and the other from La Paz, Baja California. Neither of the syntypes was illustrated. The specimen from La Paz (U.S.N.M. No. 88831) is here designated the lectotype.

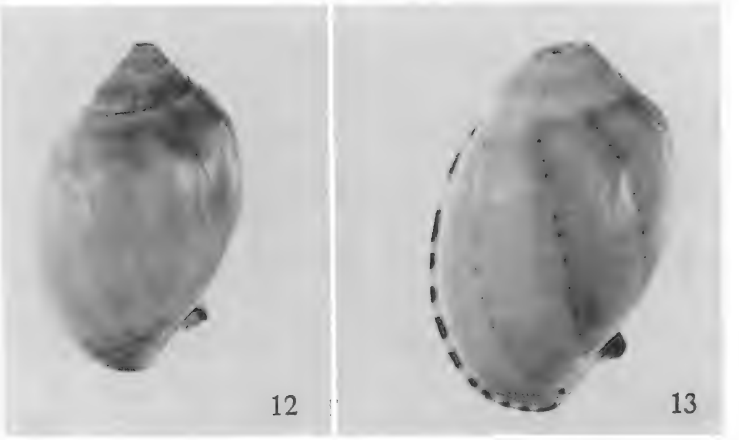


FIG. 12. Dorsal view of *Casmaria vibexmexicana* (Stearns), with an immature lip, San Juanito Island, Tres Marías Islands, Mexico, shore (Station 36; A.M.N.H. No. 74311). × 1.

FIG. 13. Dorsal view of an adult specimen of *Casmaria vibexmexicana* (Stearns), Santa Catalina Island, Baja California, Mexico (*ex* Belvedere Expedition; S.D.N.-H.M. No. 44175). × 1.

Although Stearns (1894) proposed a hyphenated name for this taxon, under the recently revised International Code of Zoological Nomenclature, compound names are to be united without a hyphen and the name is to be treated as though originally published in that form (Stoll *et al.*, 1961).

Casmaria vibexmexicana has close affinities with *Casmaria vibex* Linné of the Indo-Pacific region and may be only a subspecies of that variable and wide-ranging species. It has remained a rarity since its discovery. Although no living specimens are known, a fresh specimen was recently recorded by Keen (1960) from Lobos Island, near La Paz, Baja California, and a few other specimens are known (see Emerson and Old, 1963a). The

specimen in the present collection was taken on the beach at San Juanito Island of the Tres Marías Group and is a small, badly worn specimen that had been occupied by hermit crabs.

GENUS *SEMICASSIS* MÖRCH, 1852

TYPE SPECIES: *Cassis japonica* Reeve, 1848, Recent, western Pacific, by subsequent designation of Harris, 1897.

Semicassis centiquadrata (Valenciennes), 1832

Figures 14, 15

Cassis abbreviata "Lamarck" AUCT. Not Lamarck, 1822.
[?] *Cassis corrugata* SWAINSON, 1822, app. p. 5; 1841, p. 35.
Cassis centiquadrata VALENCIENNES, 1832, p. 310.
Cassis doliata VALENCIENNES, 1832, p. 311.
Cassis (Semicassis) centiquadrata (Valenciennes), KEEN, 1958, p. 340, fig. 315.

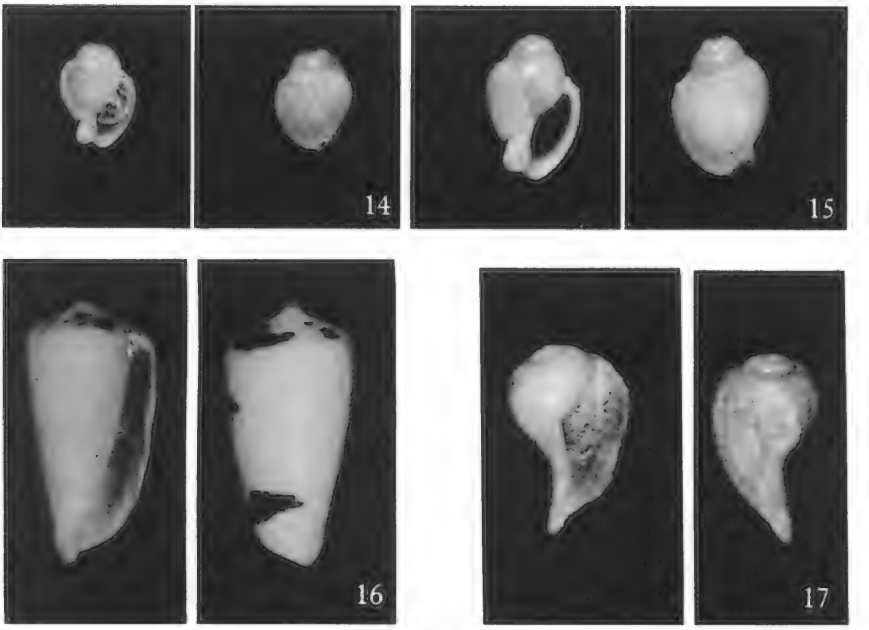
RANGE: Magdalena Bay, west coast of Baja California (United States National Museum collection), to Punta Peñasco, Sonora, Mexico (Lowe, 1935), in the Gulf of California, and south to Lobitos, Peru (Olsson, 1924).

COLLECTING STATIONS: *Baja California, Gulf coast:* Los Frailes Bay, shore collecting, one beach specimen (Station 84); Espíritu Santo Island, "Puritan" dredge, 10–12 fathoms, one fresh, hermit-crab specimen (Station 96); South San Lorenzo Island, shore collecting, three beach specimens (Station 166); Angel de la Guarda Island, shore collecting, one beach specimen (Station 169); Gonzaga Bay, shore collecting, one beach specimen (Station 176). *Sonora:* San Pedro Bay, shore collecting, two beach specimens (Station 156). *Tres Marías Islands, Nayarit:* South of Puerto Balleto, María Madre Island, 0.5–1 fathom, skin diving, one dead specimen (Station 25); off María Madre Island, "Puritan" dredge, 14–15 fathoms, one dead, juvenile specimen (Station 72); off María Magdalena Island, "Puritan" dredge, 20 fathoms, one living, juvenile specimen (Station 68); off María Magdalena Island, "Puritan" dredge, 20–24 fathoms, one living, juvenile specimen (Station 70).

REMARKS: The earliest available name for this species seems to be *Cassis corrugata* Swainson (1822), providing this taxon is based on a specimen from the stated type locality, "Gallipagos." Although the name was proposed without an illustration, the brief description applies only to the present species of the known Recent, eastern Pacific representatives of this genus. The type specimen apparently was sold at auction in 1822 with the Bligh Collection and is presumed lost. Inasmuch as many of the species described in the "Bligh Catalogue" possess mislocalized data, we propose to consider *Cassis corrugata* a *species inquirenda* at this time.

Strong and Hanna (1930) cited *"Cassidea abbreviata* Lamarck" from the Tres Marías Islands.

This species was recorded from the Pleistocene of Ceralvo Island, Baja California (Emerson, 1960).



FIGS. 14, 15. Juvenile specimens of *Semicassis centiquadrata* (Valenciennes). 14. María Magdalena Island, Tres Marías Islands, Mexico, "Puritan" dredge, 20–24 fathoms (Station 70; A.M.N.H. No. 75277). *Left:* Apertural view, with operculum in place. *Right:* Dorsal view. × 3.5. 15. Off María Magdalena Island, Tres Marías Islands, Mexico, "Puritan" dredge, 20 fathoms (Station 68; A.M.N.H. No. 75244). *Left:* Apertural view. *Right:* Dorsal view. × 3.

FIG. 16. Subadult specimen of *Morum (Morum) tuberculosum* Reeve, with an immature lip, beach at Villamil Settlement, Albermarle Island, Galapagos Islands (*ex* C. R. de Sola; A.M.N.H. No. 87146). *Left:* Apertural view. *Right:* Dorsal view. Approximately × 2.

FIG. 17. Juvenile specimen of *Ficus (Ficus) ventricosa* (Sowerby), off Punta Escondido, Baja California, Mexico, "Puritan" dredge, 18–20 fathoms (Station 138; A.M.N.H. No. 76451). *Left:* Apertural view. *Right:* Dorsal view. × 4.

GENUS *MORUM* RÖDING, 1798

TYPE SPECIES: *Morum purpureum* Röding, 1798 [= *Strombus oniscus* Linné, 1758], Recent, western Atlantic, by monotypy.

A synonymy of the taxa referable to this genus is given by Clench and

Abbott (1943). The name *Cancellomorum* is here proposed for the cancellate species, with *Morum grande* (A. Adams), 1855, as the type species.

Morum (Morum) tuberculosum (Reeve), 1842

Figure 16

Oniscia tuberculosum G. B. Sowerby, I, 1824, p. 2; *nomen nudum.*

Oniscia tuberculosa "Sowerby" Reeve, 1842, p. 211, pl. 253, figs. 2–4.

Oniscis lamarckii Deshayes, 1844, p. 12. Clench and Abbott, 1943, p. 5. Not Lesson, 1840.

Morum xanthostoma A. Adams, 1854, p. 174.

Morum tuberculosum "Sowerby" Hertlein and Strong, 1955b, pp. 267, 268. Keen, 1958, p. 341, fig. 316.

Range: ?Cedros Island, west coast of Baja California (Lowe, 1913); Magdalena Bay, Baja California (Hertlein and Strong, 1955b), to Guaymas, Sonora, Mexico (United States National Museum collection), in the Gulf of California, and south to Mancora, Peru, and the Galapagos Islands (Hertlein and Strong, 1955b).

Collecting Stations: *Tres Marías Islands, Nayarit:* San Juanito Island, shore collecting, three beach specimens (Station 36); San Juanito Island, skiff dredge, 9–11 fathoms, two dead specimens (Station 38); Puerto Balleto, María Madre Island, shore collecting, one beach specimen (Station 27); Puerto Balleto, María Madre Island, shore collecting, one beach specimen (Station 34); María Magdalena Island, shore collecting, two beach specimens (Station 48); Cleofas Island, shore collecting, one beach specimen (Station 65).

Remarks: This species was previously reported from the Tres Marías Islands by Strong and Hanna (1930).

It was recorded as a Pleistocene fossil from Magdalena Bay, on the west coast of Baja California, by Jordan (1936) and Oaxaca, Mexico, by Palmer and Hertlein (1936).

FAMILY FICIDAE

GENUS *FICUS* RÖDING, 1798

Type Species: *Bulla ficus* Gmelin [= *Bulla ficus* Linné, 1758 = *Ficus variegata* Röding, 1798], Recent, Indo-Pacific, by tautonymy and subsequent designation of Dall, 1906.

Ficus (Ficus) ventricosa (Sowerby), 1825

Figure 17

Pyrula ventricosa G. B. Sowerby, I, 1825, app. p. xvi.

Bulla decussata Wood, 1828, p. 9, pl. 3, fig. 3.

Ficus (Ficus) ventricosa (Sowerby), Grant and Gale, 1931, p. 743.

Pirula ventricosa (Sowerby), BAYER, 1939, pp. 382, 383.
Ficus ventricosa (Sowerby), KEEN, 1958, p. 342, fig. 317.

RANGE: Magdalena Bay, west coast of Baja California ("Puritan" expedition), to Puertecitos, Baja California, Mexico (DuShane, 1962), in the Gulf of California, and south to Negritos, Peru (Olsson, 1924).

COLLECTING STATIONS: *Baja California, west coast:* Magdalena Island, shore collecting, two beach specimens (Station 11). *Baja California, Gulf coast:* Off Puerto Escondido, "Puritan" dredge, 18–20 fathoms, one dead, juvenile specimen (Station 138); South San Lorenzo Island, shore collecting, one beach specimen (Station 166); off San Luis Island, "Puritan" dredge, 28 fathoms, one dead specimen (Station 179).

REMARKS: This species has been reported from the Pliocene of Coyote Mountain, Imperial County, California (Hanna, 1926), and from the Pleistocene of Magdalena Bay, on the west coast of Baja California (Jordan, 1924, 1936).

SUPERFAMILY CYMATIACEA

FAMILY CYMATIIDAE

GENUS *CYMATIUM* RÖDING, 1798

TYPE SPECIES: *Cymatium femorale* Röding, 1798 [= *Murex femorale* Linné, 1758], Recent, western Atlantic, by subsequent designation of Dall, 1904.

SUBGENUS *GUTTURNIUM* MÖRCH, 1852

TYPE SPECIES: *Triton tuberosum* Lamarck, 1822 [= *Distorsio muricina* Röding, 1798], Recent, western Atlantic and Indo-Pacific, by subsequent designation of Dall, 1904.

Cymatium (Gutturnium) amictum Reeve, 1844

Triton amictus REEVE, 1844a, pl. 15, fig. 62.
Triton (Gutturnium) amictus Reeve, TRYON, 1880, p. 22, pl. 40, fig. 188.
Cymatium amictum Reeve, STRONG AND HERTLEIN, 1937, pp. 172, 173, pl. 34, figs. 17, 18. SHASKY, 1960, p. 22.
Cymatium (Gutturnium) amictum Reeve, KEEN, 1958, p. 344, fig. 319.

RANGE: Puerto Refugio, Angel de la Guarda Island, Baja California ("Puritan" expedition) in the Gulf of California, and south to the Gulf of Tehuantepec, Mexico (Keen, 1958).

COLLECTING STATIONS: *Baja California, Gulf coast:* Los Frailes Bay, "Puritan" dredge, 20–40 fathoms, two fresh specimens, with periostracum (Station 89); Puerto Refugio, Angel de la Guarda Island, "Puritan" dredge, 17–19 fathoms, one living specimen (Station 173).

REMARKS: Although Reeve (1844a) attributed this species to the "Philippine Islands; Cuming," Strong and Hertlein (1937) recorded and illustrated a specimen from 35 fathoms off San Simon Bay, Chiapas, Mexico. Eleven additional specimens are present in the collections of the American Museum of Natural History from the Templeton Crocker Expedition of 1936 (Beebe, 1937). Four specimens were taken in 45 fathoms on the Gorda Banks, latitude 23° 01′ N. (Station 150-D-23), and seven specimens were dredged in 50 fathoms on the Arena Bank, latitude 23° 28′ N. (Station 136-D-27), off the east coast of Baja California, south of La Paz. Shasky (1960) reported dredging specimens of this species in 18–55 fathoms off Guaymas, Sonora.

The presence of a specimen in the "Puritan" collection from Puerto Refugio, on the northern part of Angel de la Guarda Island, extends the known northern range of this species well into the upper part of the Gulf of California. This is a particularly fine specimen that measures approximately 56 mm. in height.

SUBGENUS *SEPTA* PERRY, 1810

TYPE SPECIES: *Septa scarlatina* Perry, 1810 [= *Murex rubecula* Linné, 1758], Recent, Indo-Pacific and western Pacific, by monotypy.

Cymatium (*Septa*) *pileare* (Linné), 1758

Figures 18–20

Murex pileare LINNÉ, 1758, p. 749.

Triton pileare Linné, LAMARCK, 1816, pl. 415, figs. 4a–b, Liste p. 4.

Triton aquatilis REEVE, 1844a, *Triton* pl. 7, fig. 24; 1844b, p. 114.

Triton martinianum d'ORBIGNY, 1845, p. 249; 1853 (1842–1853), p. 162.

Litiopa effusa C. B. ADAMS, 1850, p. 71. TURNER, 1956, p. 136, pl. 21, fig. 3 [lectotype].

Triton intermedius PEASE, 1869, p. 74. CLENCH AND TURNER, 1957, pp. 216, 217, pl. 122, fig. 2 [lectotype], as *Cymatium* (*Septa*) *pileare* (Linné).

Triton veliei CALKINS, 1878, p. 235, pl. 8, figs. 1, 2.

Triton (*Lampusa*) *vestitum* Hinds, STEARNS, 1894, pp. 188, 203. Not Hinds, 1844.

Cymatium vestitum insulare PILSBRY, 1921, p. 320.

Cymatium pilearis [*sic*] Linnaeus, STRONG AND HANNA, 1930, p. 18.

Dissentoma prima PILSBRY, 1945, p. 59, fig. 1; 1949, p. 142.

Cymatium vestitum Hinds, HERTLEIN AND EMERSON, 1953, p. 351, in part, pl. 27, fig. 12 only. HERTLEIN AND ALLISON, 1960, p. 15. Not Hinds, 1844.

Cymatium (*Septa*) *pileare* Linné, CLENCH AND TURNER, 1957, pp. 216–220, pl. 112, figs. 1, 2, pl. 113, fig. 7, pl. 122, figs. 1–3, pl. 123.

RANGE IN EASTERN PACIFIC: Cedros Island, west coast of Baja California, to La Paz (San Diego Natural History Museum collection) and north to San José Island, Baja California, Mexico (United States Na-

tional Museum collection), in the Gulf of California, and south to Bahía Honda, Panama (the American Museum of Natural History collection); Tres Marías Islands (Strong and Hanna, 1930) and Socorro Island, Mexico (San Diego Natural History Museum collection); and Clipperton Island (the American Museum collection).

FIG. 18. Adult specimen of *Cymatium (Septa) pileare* (Linné), San Juanito Island, Tres Marías Islands, Mexico, skin diving, 0.5–3 fathoms (Station 35; A.M.N.H. No. 74263). *Left:* Apertural view, showing periostracum. *Right:* Dorsal view. Approximately × 1.

COLLECTING STATIONS: *Tres Marías Islands, Nayarit:* San Juanito Island, skin diving, 0.5–3 fathoms, one living specimen (Station 35); Puerto Balleto, María Madre Island, shore collecting, five beach specimens (Station 27); Puerto Balleto, María Madre Island, shore collecting, two fresh, beach specimens (Station 34).

REMARKS: The eastern Pacific representatives of the wide-ranging *Cymatium pileare* complex have been generally referred to *Cymatium vestitum* (Hinds, 1844; see Hertlein and Strong, 1955b, p. 263). The present

specimens, however, are definitely referable to the tropipolitan *C. pileare* group, especially the Hawaiian form described as *Triton intermedius* by Pease (1869) and *Cymatium vestitum insulare* by Pilsbry (1921). The lectotype of the latter taxon is here figured for the first time (see fig. 19, left).

Cymatium (*Septa*) *vestitum* (Hinds) apparently is a valid species that is characterized by a low spire with canaliculate sculpture, an inflated outline, and a white aperture, with dark brown stains between the plications

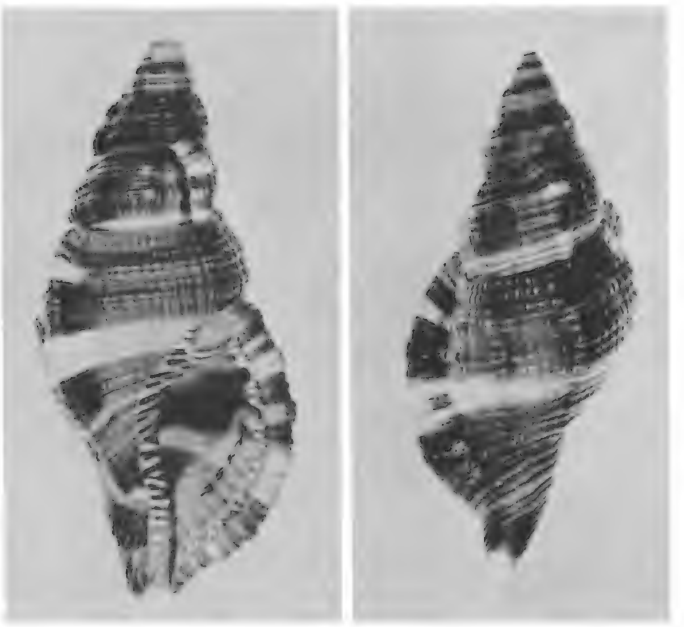


FIG. 19. Type specimens of *Cymatium vestitum insulare* Pilsbry [= *Cymatium (Septa) pileare* (Linné)]. *Left:* Apertural view of lectotype, "Sandwich Is." [Hawaiian Islands] (*ex* R. E. Griffith; A.N.S.P. No. 35279). Approximately × 1. *Right:* Dorsal view of paralectotype, Honolulu Harbor, Oahu, Hawaii (*ex* I. Spalding; A.N.S.P. No. 139220). × 1.

and teeth (figs. 21–23). *Cymatium* (*S.*) *pileare* from the eastern Pacific region has a higher-spired, more slender shell, with a carnelian red or rufous-colored aperture and white plications and teeth (fig. 18). Tryon (1880) noted these distinctions, but believed that intermediate forms existed between the Indo-Pacific and the west American forms.

The range of *Cymatium* (*Septa*) *vestitum* appears to be limited to the region from Manzanillo, Colima, Mexico, to Panama, the Galapagos Islands, and possibly extends to Peru (Hertlein and Strong, 1955b). We have examined the following specimens: Manzanillo, Mexico (San Diego

Natural History Museum collection, two mature and two juvenile specimens); Acapulco, Mexico (San Diego Natural History Museum collection, one adult specimen); San Juan del Sur, Nicaragua (San Diego Natural History Museum collection, seven specimens); San Lucas Island, Costa Rica (United States National Museum collection, two specimens); Piedra Blanca, Costa Rica (the American Museum of Natural History collection, two specimens); Montijo Bay, Panama (San Diego Natural

FIG. 20. Apertural view of adult specimen of *Cymatium (Septa) pileare* (Linné), showing periostracum, Burias Island, Philippines (*ex* R. L. Stuart; A.M.N.H. No. 98726). × ⅔.

FIG. 21. Apertural view of adult specimen of *Cymatium (Septa) vestitum* (Hinds), showing periostracum, Venado Island, Panama (Harris Dawson collection). Approximately × 1.

History Museum collection, five specimens); Taboga Island, Panama (San Diego Natural History Museum collection, two specimens); Molino Cove, Piñas Bay, Panama (the American Museum of Natural History collection, one specimen, recorded by Hertlein and Strong, 1955b); San José Island, Perlas Islands, Panama (the American Museum collection, two specimens, "Askoy" Expedition and *ex* Levine collection); Venado

Island, Panama, here figured (H. P. Dawson collection); Albemarle Island, Galapagos Islands (San Diego Natural History Museum collection, one specimen); and Academy Bay, Santa Cruz Island, Galapagos Islands (the American Museum of Natural History collection, two specimens).

Orcutt (1921) and Jordan (1926) cite the occurrence of *Cymatium vestitum* in the Pleistocene deposits of San Quintin Bay, on the west coast of

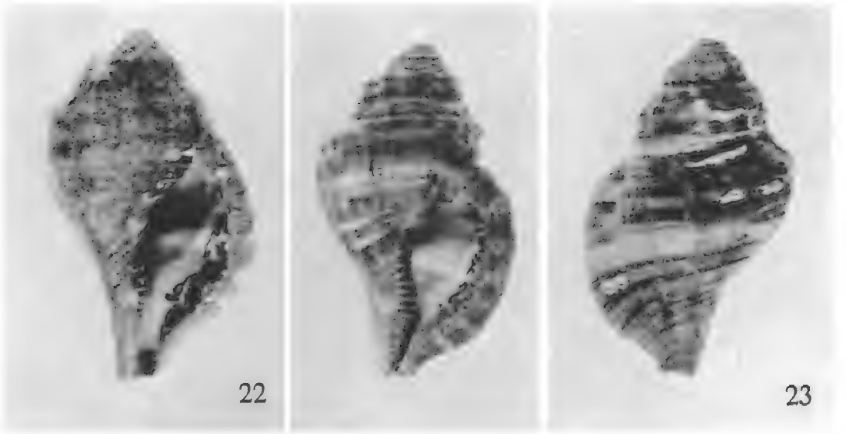


FIG. 22. Apertural view of small adult specimen of *Cymatium (Septa) vestitum* (Hinds), showing periostracum, Perlas Islands, Panama (*ex* Stanley Levine; A.M.N.H. No. 103575). × 1.

FIG. 23. Small adult specimen of *Cymatium (Septa) vestitum* (Hinds), without periostracum, West Panama (*ex* "Askoy" Expedition; A.M.N.H. No. 102798). *Left:* Apertural view. *Right:* Dorsal view. × 1.

Baja California, Mexico. These records may be referable to the present species.

SUBGENUS *MONOPLEX* PERRY, 1811

TYPE SPECIES: *Monoplex australasiae* Perry, 1811 [= *Murex parthenopeum* von Salis, 1793], Recent, eastern and western Atlantic, eastern Pacific, and Indo-Pacific, by subsequent designation of Clench and Turner, 1957.

Cymatium (*Monoplex*) *parthenopeum* (von Salis), 1793

Murex costatus BORN, 1778 [?1780], p. 295; 1780, pp. 297, 298. Not Pennant, 1777. Not Gmelin, 1791, p. 3543, or p. 3549.

Murex parthenopeus VON SALIS, 1793, p. 370, pl. 7, fig. 4. [Not seen.]

Monoplex australasiae PERRY, 1811, pl. 3, fig. 3.

Triton succinctum LAMARCK, 1816, pl. 416, fig. 2, Liste p. 5.

Triton americanum d'Orbigny, 1842 (1842–1853), p. 163, pl. 23, fig. 22.
Triton brasilianum Gould, 1849, p. 142.
Triton (Simpulum) acclivis Hutton, 1873, p. 13, fig. 8.
Cymatium echo Kuroda and Habe, 1950, p. 30. Kira, 1955, p. 43, pl. 21, fig. 13; 1959, pp. 53, 54, pl. 21, fig. 13.
Cymatium (Monoplex) parthenopeum von Salis, Clench and Turner, 1957, p. 228, pl. 128, figs. 1–3. Keen, 1958, p. 346, fig. 322.

Range in Eastern Pacific: South San Lorenzo Island, Baja California ("Puritan" expedition), in the Gulf of California, and south to the Galapagos Islands (Hertlein and Strong, 1955a).

Collecting Station: *Baja California, Gulf coast:* South San Lorenzo Island, shore collecting, one beach specimen (Station 166).

Remarks: This species apparently has a cosmopolitan distribution in tropical and subtropical waters. The foregoing synonymy largely follows Clench and Turner (1957), with the addition of *Cymatium echo* Kuroda and Habe (1950).

Although only one example of this species was taken by the expedition, the specimen extends the recorded northern range from La Paz, Baja California (Keen, 1958), to South San Lorenzo Island, well within the Gulf of California.

This species was cited from the Pleistocene of the Galapagos Islands (Hertlein and Strong, 1955a).

SUBGENUS *TURRITRITON* DALL, 1904

Type Species: *Triton gibbosum* Broderip, 1833, Recent, eastern Pacific, by original designation.

Cymatium (*Turritriton*) *gibbosum* (Broderip), 1833

Triton gibbosus Broderip, 1833, p. 7.
Triton (Gutturnium) gibbosus Brod.[erip], Tryon, 1880, p. 23, pl. 12, figs. 101, 103.
[?] *Cymatium adairense* Dall, 1910, pp. 33, 34.
Cymatium (Turritriton) gibbosum (Broderip), Keen, 1958, p. 346, fig. 324.

Range: Puertecitos, Baja California, Mexico (DuShane, 1962), in the Gulf of California, and south to Negritos, Peru (Olsson, 1924).

Collecting Stations: *Baja California, Gulf coast:* Los Frailes Bay, "Puritan" dredge, 20–40 fathoms, two dead specimens, one form *adairense* and one "typical" form (Station 89); off Coronados Island, "Puritan" dredge, 13–16.5 fathoms, one dead specimen, form *adairense* (Station 144). *Sonora:* San Carlos Bay (ocean side), skin diving, 1–2.5 fathoms, one living specimen, "typical" form (Station 155). *Tres Marías Islands, Nayarit:* Puerto Balleto, María Madre Island, shore collecting, two beach

specimens, "typical" form (Station 27); Puerto Balleto, María Madre Island, shore collecting, two beach specimens, "typical" form (Station 34); off María Madre Island, "Puritan" dredge, 6–10 fathoms, one dead specimen, form *adairense* (Station 73); off María Magdalena Island, skiff dredge, 9–11 fathoms, one dead specimen, form *adairense* (Station 49); off María Magdalena Island, "Puritan" dredge, 35 fathoms, one juvenile, living specimen, form *adairense* (Station 66).

Remarks: Dall (1910) described *Cymatium adairense* on the basis of specimens dredged in the Gulf of California at Adair Bay, Sonora, and off La Paz, Baja California. He compared his species with the present species, which he stated has "a much heavier, larger, proportionately wider and more clumsy shell." Dall's taxon would appear to be a form of *C. gibbosum,* as "typical" specimens of the present species also occur in the Gulf of California, as well as in the southern part of the Panamic province. However, we have seen specimens of Dall's taxon from localities only as far south as Manzanillo, Mexico (A.M.N.H. No. 94090).

GENUS *DISTORSIO* RÖDING, 1798

Type Species: *Distorsio anus* (Linné) [= *Murex anus* Linné, 1758], Recent, Indo-Pacific, by subsequent designation of Pilsbry, 1922.

A review of the generic and specific taxa referable to this genus was presented by Emerson and Puffer (1953). The gender of the name *Distorsio* is feminine (Woodring, 1959).

SUBGENUS *RHYSEMA* CLENCH AND TURNER, 1957

Type Species: *Triton clathratus* Lamarck [= *Triton clathratum* Lamarck, 1816], Recent, western Atlantic, by original designation.

Distorsio (*Rhysema*) *constricta* (Broderip), 1833

Figure 24

Triton constrictus Broderip, 1833, p. 5. Emerson and Puffer, 1953, vol. 66, p. 98.
Distorsio constrictus Broderip, Pilsbry and Olsson, 1941, p. 40, pl. 5, fig. 12. Keen, 1958, p. 346, fig. 325.

Range: Tiburón Island, Sonora, Mexico ("Puritan expedition"), in the Gulf of California and south to Mancora, Ecuador (Academy of Natural Sciences of Philadelphia collection).

Collecting Stations: *Baja California, Gulf coast:* Los Frailes Bay, "Puritan" dredge, 20–40 fathoms, two dead specimens (Station 89); San José Island, "Puritan" dredge, 36.5–40 fathoms, two living specimens (Station 116); off Puerto Escondido, "Puritan" dredge, 18–20 fathoms, one living specimen (Station 138). *Sonora:* Off Tiburón Island, "Puritan" dredge, 40

fathoms, one living specimen (Station 162). *Tres Marías Islands, Nayarit:* Off María Magdalena Island, "Puritan" dredge, 13–15 fathoms, one living specimen (Station 71).

REMARKS: The presence of a large, mature specimen in the present collection from off Red Bluff, on the south side of Tiburón Island (latitude 28° 45′ 30″ N.), extends the known northern range of this species well within the Gulf of California.

FIG. 24. Apertural view of adult specimen of *Distorsio (Rhysema) constricta* (Broderip), showing periostracum, off Tiburón Island, "Puritan" dredge, 40 fathoms (Station 162; A.M.N.H. No. 77066). Approximately × 1.

FIG. 25. Apertural view of adult specimen of *Distorsio (Rhysema)* decussata (Valenciennes), showing periostracum, Punta Arena area, Baja California, Mexico, 45 fathoms (*ex* Templeton-Crocker Expedition; A.M.N.H. No. 85335). × 1.

This species, especially juvenile specimens, has been confused with the next species. [See remarks under *Distorsio* (*R.*) *decussata* (Valenciennes).]

Distorsio (*Rhysema*) *decussata* (Valenciennes), 1832

Figure 25

Tritonium decussatum VALENCIENNES, 1832, p. 306. EMERSON AND PUFFER, 1953, p. 99.

Distorsio decussatus Valenciennes, PILSBRY AND OLSSON, 1941, p. 40, pl. 5, fig. 9. HERTLEIN AND STRONG, 1955b, pp. 265, 266. KEEN, 1958, p. 346, fig. 326.

RANGE: Off Cabo Harbo, Guaymas, Sonora, Mexico (Shasky, 1959), in the Gulf of California, and south to Manta, Ecuador (Hertlein and Strong, 1955b).

COLLECTING STATION: *Baja California, Gulf coast:* Off Coronados Island, "Puritan" dredge, 40–45 fathoms, one dead specimen (Station 145).

REMARKS: As Hertlein and Strong (1955b) pointed out, it is difficult to separate the juveniles of this species from those of *Distorsio* (*Rhysema*) *constricta* (Broderip), which occupies the same geographic range. The adults, however, are readily differentiated. The adults of the present species are generally larger and narrower, and less constricted, than those of *D. constricta,* and possess two or more major plaits on the inner lip near the posterior end of the aperture, whereas *D. constricta* has one major plait on this part of the aperture.

FAMILY COLUBRARIIDAE

GENUS *COLUBRARIA* SCHUMACHER, 1817

TYPE SPECIES: *Colubraria granulata* Schumacher, 1817 [= *Murex maculosa* Gmelin, 1791], Recent, Indo-Pacific, by subsequent designation of Harris, 1897.

Colubraria siphonata (Reeve), 1844

Figures 26–28

Triton siphonatus REEVE, 1844a, *Triton* pl. 18, fig. 81; 1844b, p. 119. KEEN, 1958, p. 348.

Colubraria aphrogenia PILSBRY AND LOWE, 1932, pp. 62, 63, pl. 4, fig. 10. HERTLEIN AND STRONG, 1955b, pp. 266, 267. KEEN, 1958, p. 348, fig. 331.

Colubraria panamensis MAXWELL SMITH, 1947, p. 55, pl. 2, fig. 6. KEEN, 1958, p. 348, fig. 334.

Colubraria perla MAXWELL SMITH, 1947, p. 55, pl. 2, fig. 2. KEEN, 1958, p. 348.

Colubraria siphonata Reeve, CAMPBELL, 1961, pp. 138–140, text fig. 2, pl. 10, figs. 3, 4.

RANGE: San Luis Island, Baja California ("Puritan" expedition), in the Gulf of California and south to the Perlas Islands, Panama (Maxwell Smith, 1947).

COLLECTING STATIONS: *Baja California, Gulf coast:* Off San Luis Island, "Puritan" dredge, 28 fathoms, two dead specimens (Station 179); off San Marcos Island, "Puritan" dredge, 10–11.5 fathoms, one dead specimen (Station 151); off Coronados Island, "Puritan" dredge, 13–16.5 fathoms, one dead specimen (Station 144); off Puerto Escondido, "Puritan" dredge, 18–20 fathoms, one dead specimen (Station 138). *Tres Marías Islands, Nayarit:* Off María Madre Island, "Puritan" dredge, 22–24 fathoms, one dead specimen (Station 59); off María Madre Island, "Puritan"

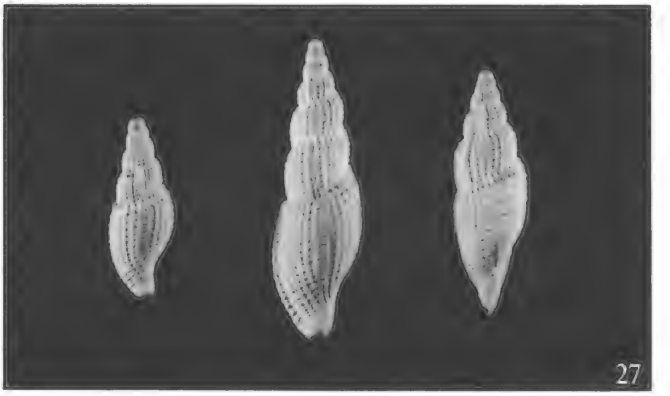


FIG. 26. Apertural view of three specimens of *Colubraria siphonata* (Reeve), off María Magdalena Island, Tres Marías Islands, Mexico, "Puritan" dredge, 13–15 fathoms (Station 71; A.M.N.H. No. 75347). *Left:* A small specimen of the "typical" form. *Center:* Form *perla* M. Smith. *Right:* Form *aphrogenia* Pilsbry and Lowe. × 2.

FIG. 27. Dorsal view of three specimens of *Colubraria siphonata* (Reeve). *Left:* Form *aphrogenia* Pilsbry and Lowe, Pinas Bay, Panama (*ex* "Askoy" Expedition; A.M.-N.H. No. 73287). *Center and right:* Form *panamensis* M. Smith, off San Luis Island, Baja California, Mexico, "Puritan" dredge, 7–10 fathoms (Station 179; A.M.N.H. No. 77427). × 2.

dredge, 14–15 fathoms, six specimens, including two juveniles (Station 72); off María Magdalena Island, "Puritan" dredge, 13–15 fathoms, one dead specimen (Station 71).

REMARKS: Campbell (1961), in a recent review of the west American species of *Colubraria,* proposed the synonymy cited above for this species. Since the appearance of his paper, Campbell has received from the British Museum (Natural History) photographs of a syntype of *Triton siphonatus* Reeve, which was originally described and illustrated without indication of size or locality. Through the courtesy of Dr. Campbell, we have

examined these photographs (see fig. 28). We concur with the conclusion of Dr. Campbell (*in litteris,* October 12, 1962) that Reeve's taxon is referable to the eastern Pacific species named *Colubraria aphrogenia* by Pilsbry and Lowe (1932), *C. panamensis* Smith (1947), both based on immature specimens, and *C. perla* Smith (1947), based on a mature specimen. (See figs. 26, 27.)

All the present specimens possess a simple, truncated nuclear whorl, which is characteristic of *C. siphonata* (fig. 28). The surface sculpture, however, varies considerably among individuals and with the age and preser-

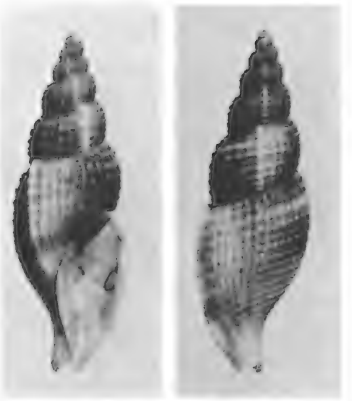


FIG. 28. Syntype of *Colubraria siphonata* (Reeve), locality unknown (*ex* H. Cuming; B.M.N.H. No. 19621094). *Left:* Apertural view. *Right:* Dorsal view. Courtesy of Dr. G. B. Campbell. × 2.

vation of the specimens. Some specimens have faint axial lines on the second whorl of the protoconch. The ribs on the post-nuclear whorls vary from reticulate to strongly cancellate. Small beads occur at the intersection of the ribs in some specimens (fig. 27, center). Others have fine spiral threads between the spiral ribs (fig. 27, right). In worn specimens, these give the appearance of alternating weak and strong spiral ribs. In some specimens, the surface is raised into axial pleats, with the axial ribs situated on the ridges.

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